Journal of Comprehensive Surgery

Original Article

DOI: 10.51271/JOCS-0053

Transanal minimally invasive surgery (TAMIS) for malign or benign rectal lesions: a series of 19 cases

Umut Fırat Turan[1], Emre Mevlüt Onat[2], Mustafa Kaan Gençalp[3], Emre Şimşek[3], Tezcan Akın[3], Özgür Akgül[3], Erdinç Çetinkaya[3], Sadettin Er[3], Hüseyin Berkem[3]

[1]Department of General Surgery, Faculty of Medicine, Atlas University, İstanbul, Turkiye
[2]Department of General Surgery, Rize State Hospital, Rize, Turkiye
[3]Department of General Surgery, Ankara Bilkent City Hospital, Ankara, Turkiye

Cite this article as: Turan UF, Onat EM, Gençalp MK, et al. Transanal minimally invasive surgery (TAMIS) for malign or benign rectal lesions: a series of 19 cases. *J Compr Surg.* 2025;3(2):34-36.

Received: 18.02.2025 ◆ **Accepted**: 19.04.2025 ◆ **Published**: 08.05.2025

ABSTRACT

Aims: Colorectal cancer (CRC) is the second leading cause of death and the third leading cause of incidence worldwide. Thanks to colorectal cancer screening programs, early-stage colorectal cancers are detected more frequently. The aim of this study is to evaluate the short-term results of 19 TAMIS cases performed in our clinic.

Methods: Data of 19 patients aged ≥18 years who underwent TAMIS procedure due to rectal nonneoplastic and neoplastic polyps/T1N0 cancers at Ankara Bilkent City Hospital between September 2020 and December 2022 were analyzed retrospectively. Preoperative and postoperative findings were reviewed.

Results: Among the 19 patients, 7 (33.3%) were female, and 12 (66.7%) were male, with a mean age of 56.9 years. All patients underwent TAMIS without postoperative complications. Pathological results showed that 9 (47.4%) had neoplastic polyps (7 tubulovillous adenomas, 1 serrated adenoma, 1 adenocarcinoma), while 10 (52.6%) had non-neoplastic polyps. The patient with adenocarcinoma showed mucosal and submucosal invasion with a tumor base 1 mm from the margin. At the 3-month follow-up, rectoscopy revealed no pathological findings, only fibrosis.

Conclusion: TAMIS is an effective method for selected cases of early-stage rectal cancer that are well-staged preoperatively, offering a low-morbidity alternative to more invasive surgical approaches. Since our cases do not have long-term follow-ups, a clearer judgment can be reached with the results of long-term follow-ups.

Keywords: TAMIS, polyp, rectal cancer, minimally invasive surgery, effectiveness

INTRODUCTION

Transanal minimally invasive surgery (TAMIS) has attracted attention in recent years as one of the important innovations in colorectal surgery. First described by Atallah et al.[1] in 2010, this technique offers a safe and effective method for the removal of both benign and early-stage rectal lesions.[2,3] Compared to transanal endoscopic microsurgery (TEM), TAMIS offers a less invasive option, stands out with its lower costs and less complex device infrastructure.[1] With these features, it has rapidly gained popularity among colorectal surgeons and has become an important alternative in the field of minimally invasive surgery.[4]

TAMIS is suitable for benign and early-stage malignant lesions confined to the submucosal layer, as identified by preoperative magnetic resonance imaging (MRI) or endoscopic ultrasonography (EUS). For patients with early-stage cancer and poor histologic features (lymphatic/vascular/perineural invasion, poor differentiation, tumor budding) or deeper invasion (submucosal levels: sm2 or sm3), TAMIS is not recommended, and they should be managed as T2 lesions.[5] Also the European Society for Medical Oncology (ESMO) and the American Society of Colon and Rectal Surgeons (ASCRS) advise proctectomy with whole mesorectal excision for cT1 rectal cancers that are sm2 or sm3, but local excision for those that are sm1.[6,7] In patients with indeterminate lesions (T1 vs T2), TAMIS can be used for definitive tumor staging, but further radical surgery may be needed if poor features or deeper invasion are present.[5]

While The gold standard for treating locally advanced or node-positive rectal tumors is complete mesorectal excision (CME).[8] Furthermore, positive results have also been observed in the treatment of locally advanced malignancies in conjunction with neoadjuvant chemoradiotherapy, although comprehensive evaluation of the role of TAMIS in non-early rectal cancer still requires randomized controlled trials with long-term follow-up and standard procedures.[9] Other indications for TAMIS include anastomotic dehiscence, rectal stenosis, re-excision for R1 resections, and cases where endoscopic removal is not possible due to tumor size, location, or morphology. According to the NCCN guidelines, localized trans anal excision is recommended for movable, non-fixed

Corresponding Author: Tezcan Akın, drtezcanakin@gmail.com

This work is licensed under a Creative Commons Attribution 4.0 International License.

rectal tumors, small tumors (<3 cm), or tumors affecting less than one-third of the rectal wall circumference.[5]

While prospective data are lacking, TAMIS offers comparable results with TEM in terms of oncologic outcomes, 5-year disease-free survival, peritoneal violation and postoperative morbidity[10]. TEM and TAMIS offer similar outcomes for rectal neoplasms, but TEM has longer operative times. TAMIS is preferred for its cost, time efficiency, and ease for less experienced surgeons. With advancements, TEM has become obsolete, and TAMIS has enabled faster adoption of TaTME.[11]

In this study, the clinical outcomes of patients who underwent TAMIS in our clinic and its place in the current literature will be examined and the potential benefits of this minimally invasive procedure in colorectal surgery will be discussed.

METHODS

We retrospectively analyzed the data of 19 patients who underwent TAMIS for rectal nonneoplastic and neoplastic polyps/ T1N0 cancers at Ankara Bilkent City Hospital between September 2020 and December 2022. The study included patients aged 18 years and older with T1 tumors of the middle and upper rectum without lymph node involvement on preoperative pelvic MRI. Patients with poor prognostic criteria (lymphatic/vascular/perineural invasion, poor differentiation, tumor budding) as a result of preoperative biopsy, patients with positive lymph nodes, and patients with T2 and more advanced tumor invasion were excluded. The study was carried out with the permission of Ankara Bilkent City Hospital No: 2 Clinical Researches Ethics Committee (Date: 27.111.2024, Decision No: TABED2-24-679). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Preoperative and postoperative rectoscopy/colonoscopy and radiological findings were reviewed. Patients whose data could not be accessed were excluded from the study. Age was obtained as mean (min-max). Numerical data were expressed as percentage (%).

RESULTS

Of the 19 patients included, 7 (33.3%) were female, and 12 (66.7%) were male, with a mean age of 56.9 (range: 30-82 years). All patients underwent the TAMIS procedure, and no postoperative complications were observed. Pathological results revealed that 9 patients (47.4%) had neoplastic polyps, and 10 patients (52.6%) had non-neoplastic polyps. Among the neoplastic polyps, 7 were tubulovillous adenomas, 1 was a serrated adenoma, and 1 was adenocarcinoma. Preoperative MRI for the patient with serrated adenoma showed a clear circumferential resection margin (CRM) with no involvement of the sphincter or extramesorectal lymph nodes. Postoperative colonoscopy revealed no mucosal pathology. The patient with adenocarcinoma had a preoperative imaging report indicating a soft tissue mass measuring 3.2x3.9x2.5 cm located 7 cm proximal to the anal verge on the right lateral wall of the mid-rectum. Pathology showed mucosal and submucosal invasion, no perineural or lymphovascular invasion, and a tumor base 1 mm from the surgical margin. At the 3-month postoperative follow-up, rectoscopy showed no pathological findings, and only fibrosis was observed at the surgical site. No colonoscopic findings of polyp recurrence were found in the follow-up of other neoplastic cases. Demographic and pathological examination results of the patients are given in Table.

Table. Demographic and clinical data of patients

Variables	n, (%), mean (min-max)
Patient number, n	19
Sex	
Female	7 (33.3)
Male	12 (66.7)
Mean age (min-max)	56.9 (30-82)
Polyps, n (%)	
Neoplastic	9 (47.4)
Non-neoplastic	10 (52.6)
Neoplastic polyps, n	
Tubulovillous adenoma	7
Serrated adenoma	1
Adenocarcinoma	1

Min: Minimum, Max: Maximum

DISCUSSION

Conventional transanal excision (TAE), colonoscopic resection, TEM, and TAMIS are the surgical platforms used for local excision or rectal tumors.[12] The management of early-stage rectal cancer has evolved significantly in recent years with the advancement of minimally invasive surgical techniques.[13] When compared to traditional TAE, transanal endoscopic microsurgery (TEM), which was initially described in 1984, offers better resection quality, higher negative microscopic margins, and lower recurrence rates. Its high initial cost and steep learning curve, however, have delayed its adoption in standard practice. These restrictions prompted the creation of TAMIS, which reduces expenses and permits 360° exposure of the rectal lumen using standard laparoscopic tools and a single incision port. TAMIS, which was first introduced in 2010, is a viable substitute for TEM that provides comparable advantages without the need for specialized equipment and at a significantly lower cost.[12] With advancements in technology and the adoption of TAMIS, the use of TEM has become obsolete, and TAMIS has facilitated the rapid implementation of the TaTME technique with a shorter learning curve.[11]

Transanal minimally invasive surgery (TAMIS) represents a major innovation in this field.[14] In our study, the outcomes of 19 patients who underwent TAMIS for rectal polyp or mass excision were evaluated, demonstrating the safety and efficacy of this technique in early-stage rectal cancer and large colorectal polyps.

Literature has established TAMIS as an effective treatment option for T1N0M0 rectal cancers with low-risk pathological features.[12] According to several studies, TAMIS allows for a minimally invasive approach that reduces perioperative morbidity while maintaining acceptable oncological outcomes, especially for well-selected patients.[12,15,16] The technique has been shown to be effective and safe, with low morbidity and with good quality of life (QOL) postoperatively for patients with early rectal cancer and adenomas of the mid and distal rectum.[17] Our findings are consistent with these reports, as none of the patients in our study experienced postoperative complications, and short-term follow-up revealed no recurrence of malignancy.

In our series of 19 cases including 9 neoplastic polyps, the only notable case was the one that was diagnosed as adenocarcinoma as a result of pathological examination. In this case's colonoscopy performed at the 3rd month postoperatively, there were no pathological findings, only fibrosis was detected in the excision area. No colonoscopic findings of polyp recurrence were found in the follow-up of other neoplastic cases. This result suggests that TAMIS can achieve adequate oncological outcomes when preoperative staging is accurate and the case selection is appropriate. However, the close proximity of the tumor margin to the surgical resection line (1 mm) in this case raises concerns about the potential for recurrence. Resection margin has been previously discussed in the literature regarding margin safety and the risk of local recurrence.[15,18] This highlights the importance of vigilant follow-up in such cases to ensure long-term disease control.

TAMIS offers a substantial advantage in preserving the surrounding anatomical structures while achieving sufficient oncological resection, particularly in early-stage tumors.[10] However, its limitations must also be considered. TAMIS may not be sufficient for tumors with a higher risk of lymph node metastasis or those at more advanced stages of the disease.[18] In such cases, more extensive surgery, such as total mesorectal excision (TME), may be warranted.[12]

Limitations

The limitations of this study include its retrospective nature, small sample size, and the lack of long-term follow-up data. Larger, prospective studies with longer follow-up are necessary to further validate the oncological safety and effectiveness of TAMIS.

CONCLUSION

In conclusion, TAMIS provides a minimally invasive and low-morbidity option for the treatment of early-stage rectal cancer in selected patients. Although our number of cases is low and our follow-up period is short, our findings may suggest that TAMIS is an effective and safe option for well-selected patients with early-stage rectal cancers or large benign polyps. This technique offers the potential for favorable oncological outcomes without the need for more aggressive surgical interventions, making it an attractive option in appropriate clinical scenarios.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was carried out with the permission of Ankara Bilkent City Hospital No: 2 Clinical Researches Ethics Committee (Date: 27.111.2024, Decision No: TABED2-24-679).

Informed Consent

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

REFERENCES

1. Atallah S, Albert M, Larach S. Transanal minimally invasive surgery: a giant leap forward. *Surg Endosc*. 2010;24(9):2200-2205. doi:10.1007/s00464-010-0927-z
2. Albert MR, Atallah SB, deBeche-Adams TC, Izfar S, Larach SW. Transanal minimally invasive surgery (TAMIS) for local excision of benign neoplasms and early-stage rectal cancer: efficacy and outcomes in the first 50 patients. *Dis Colon Rectum*. 2013;56(3):301-307. doi:10.1097/DCR.0b013e31827ca313
3. Melstrom KA, Kaiser AM. Role of minimally invasive surgery for rectal cancer. *World J Gastroenterol*. 2020;26(30):4394-4414. doi:10.3748/wjg.v26.i30.4394
4. Clermonts SHEM, van Loon YT, Schiphorst AHW, Wasowicz DK, Zimmerman DDE. Transanal minimally invasive surgery for rectal polyps and selected malignant tumors: caution concerning intermediate-term functional results. *Int J Colorectal Dis*. 2017;32(12):1677-1685. doi:10.1007/s00384-017-2893-6
5. Kim MJ, Lee TG. Transanal minimally invasive surgery using laparoscopic instruments of the rectum: a review. *World J Gastrointest Surg*. 2021;13(10):1149-1165. doi:10.4240/wjgs.v13.i10.1149
6. Glynne-Jones R, Wyrwicz L, Tiret E, et al. Rectal cancer: ESMO Clinical Practice Guidelines for diagnosis, treatment and follow-up. *Ann Oncol*. 2018;29(Suppl 4):iv263. doi:10.1093/annonc/mdy161
7. You YN, Hardiman KM, Bafford A, et al. The American Society of Colon and Rectal Surgeons clinical practice guidelines for the management of rectal cancer. *Dis Colon Rectum*. 2020;63(9):1191-1222. doi:10.1097/DCR.0000000000001762
8. van Gijn W, Marijnen CA, Nagtegaal ID, et al. Preoperative radiotherapy combined with total mesorectal excision for resectable rectal cancer: 12-year follow-up of the multicentre, randomised controlled TME trial. *Lancet Oncol*. 2011;12(6):575-582. doi:10.1016/S1470-2045(11)70097-3
9. Quaresima S, Palmieri L, Balla A, di Saverio S, Paganini AM. Local excision for the management of early rectal cancer. *Curr Concept Controvers Laparosc Surg*. 2022. doi:10.5772/intechopen.105573
10. Atallah S, Larach SW. Transanal minimally invasive surgery. *JAMA Surg*. 2021;156(1):92-93. doi:10.1001/jamasurg.2020.4994
11. Stipa F, Tierno SM, Russo G, Burza A. Trans-anal minimally invasive surgery (TAMIS) versus trans-anal endoscopic microsurgery (TEM): a comparative case-control matched-pairs analysis. *Surg Endosc*. 2022;36(3):2081-2086. doi:10.1007/s00464-021-08494-y
12. Devane LA, Burke JP, Kelly JJ, Albert MR. Transanal minimally invasive surgery for rectal cancer. *Ann Gastroenterol Surg*. 2020;5(1):39-45. doi:10.1002/ags3.12402
13. Chakrabarti S, Peterson CY, Sriram D, Mahipal A. Early stage colon cancer: Current treatment standards, evolving paradigms, and future directions. *World J Gastrointest Oncol*. 2020;12(8):808-832. doi:10.4251/wjgo.v12.i8.808
14. Toiyama Y, Kusunoki M. Changes in surgical therapies for rectal cancer over the past 100 years: a review. *Ann Gastroenterol Surg*. 2020;4(4):331-342. doi:10.1002/ags3.12342
15. Lee L, Burke JP, deBeche-Adams T, et al. Transanal minimally invasive surgery for local excision of benign and malignant rectal neoplasia: outcomes from 200 consecutive cases with midterm follow up. *Ann Surg*. 2018;267(5):910-916. doi:10.1097/SLA.0000000000002190
16. Duggan WP, Heagney N, Gray S, Hannan E, Burke JP. Transanal minimally invasive surgery (TAMIS) for local excision of benign and malignant rectal neoplasia: a 7-year experience. *Langenbecks Arch Surg*. 2024;409(1):32. doi:10.1007/s00423-023-03217-4
17. Caycedo-Marulanda A, Jiang HY, Kohtakangas EL. Transanal minimally invasive surgery for benign large rectal polyps and early malignant rectal cancers: experience and outcomes from the first Canadian centre to adopt the technique. *Can J Surg*. 2017;60(6):416-423. doi:10.1503/cjs.002417
18. Noh GT. Surgical techniques for transanal local excision for early rectal cancer. *Ewha Med J*. 2023;46(s1):e26. doi:10.12771/emj.2023.e26